

List of Claims

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1. (cancelled)

2. (cancelled)

3. (cancelled)

4. (cancelled)

5. (cancelled)

6. (cancelled)

7. (cancelled)

8. (original) A needle valve member for a fuel injector comprising:

a nozzle insert having an external valve surface, an internal valve seat and  
at least one nozzle outlet;

a tube irreversibly attached to said nozzle insert.

9. (currently amended) The needle valve member of claim 8 wherein said  
nozzle insert includes ~~one of a cylindrical male mating surface and a cylindrical female~~  
~~mating surface~~; and

B5

said tube having ~~an other of said cylindrical male mating surface and said~~  
a cylindrical female mating surface mated to said cylindrical male mating surface of said  
nozzle insert.

10. (currently amended) The needle valve member of claim 8 wherein  
said tube includes an external surface with a first diameter adjacent said nozzle insert and  
a second diameter away from said nozzle insert; and

said first diameter is smaller than said second diameter, and said first  
diameter is separated from said second diameter by an opening hydraulic surface.

11. (currently amended) ~~The needle valve member of claim 8 wherein~~ A  
needle valve member for a fuel injector comprising:

a nozzle insert having an external valve surface, an internal valve seat and  
at least one nozzle outlet;

a tube irreversibly attached to said nozzle insert; and

said at least one nozzle outlet includes a plurality of nozzle outlets that are  
oriented into at least one of a non-impinging spray pattern and an impinging spray  
pattern.

12. (currently amended) ~~The needle valve member of claim 8 wherein~~ A  
needle valve member for a fuel injector comprising:

a nozzle insert having an external valve surface, an internal valve seat and  
at least one nozzle outlet;

a tube irreversibly attached to said nozzle insert; and

said nozzle insert has a circumferential side surface that includes said external valve surface positioned between a guide cylindrical surface and a mating cylindrical surface.

13. (original) The needle valve member of claim 12 wherein said guide cylindrical surface has a guide length and a guide diameter that is smaller than said guide length.

14. (original) The needle valve member of claim 12 wherein said mating cylindrical surface has a mating length and a mating diameter that is smaller than said mating length.

B<sup>5</sup> 15. (original) The needle valve member of claim 8 wherein said tube includes an external surface with a first diameter adjacent said nozzle insert and a second diameter away from said nozzle insert, and said first diameter is smaller than said second diameter;

said at least one nozzle outlet includes a plurality of nozzle outlets that are oriented into at least one of a non-impinging spray pattern and an impinging spray pattern.

16. (original) The needle valve member of claim 15 wherein said nozzle insert has a circumferential side surface that includes said external valve surface positioned between a guide cylindrical surface and a mating cylindrical surface;

said guide cylindrical surface has a guide length and a guide diameter that is smaller than said guide length; and

said mating cylindrical surface has a mating length and a mating diameter that is smaller than said mating length.

17. (cancelled)

18. (cancelled)

19. (cancelled)

20. (cancelled)

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21. (currently amended) A fuel injector comprising:  
an injector body defining a plurality of second nozzle outlets; and  
the needle valve member of claim 8 at least partially positioned in said  
injector body and being movable as a unit between a first position in which said second  
nozzle outlets are open, and a second position in which said second nozzle outlets are  
closed.

22. (currently amended) The fuel injector of claim 21 wherein said  
nozzle insert includes ~~one of a cylindrical male mating surface and a cylindrical female  
mating surface~~; and  
said tube having ~~an other of said cylindrical male mating surface and said~~  
a cylindrical female mating surface mated to said cylindrical male mating surface of said  
nozzle insert.

23. (currently amended) The fuel injector of claim 21 wherein said tube includes an external surface with a first diameter adjacent said nozzle insert and a second diameter away from said nozzle insert; and

said first diameter is smaller than said second diameter, and said first diameter is separated from said second diameter by an opening hydraulic surface.

24. (currently amended) The fuel injector of claim 21 wherein said at least one nozzle outlet includes a plurality of first nozzle outlets that are oriented into at least one of a non-impinging spray pattern and an impinging spray pattern.

25. (previously presented) The fuel injector of claim 21 wherein said nozzle insert has a circumferential side surface that includes said external valve surface positioned between a guide cylindrical surface and a mating cylindrical surface.

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26. (previously presented) The fuel injector of claim 25 wherein said guide cylindrical surface has a guide length and a guide diameter that is smaller than said guide length.

27. (previously presented) The fuel injector of claim 25 wherein said mating cylindrical surface has a mating length and a mating diameter that is smaller than said mating length.

28.(currently amended) The fuel injector of claim 21 wherein said tube includes an external surface with a first diameter adjacent said nozzle insert and a second diameter away from said nozzle insert, and said first diameter is smaller than said second diameter;

said at least one nozzle outlet includes a plurality of first nozzle outlets that are oriented into at least one of a non-impinging spray pattern and an impinging spray pattern.

29. (previously presented) The fuel injector of claim 28 wherein said nozzle insert has a circumferential side surface that includes said external valve surface positioned between a guide cylindrical surface and a mating cylindrical surface;

said guide cylindrical surface has a guide length and a guide diameter that is smaller than said guide length; and

said mating cylindrical surface has a mating length and a mating diameter that is smaller than said mating length.

B5 30. (currently amended) The fuel injector of claim 21 wherein said at least one nozzle outlet has a first spray pattern; and

said ~~injector body defining at least one additional nozzle outlet that has~~ plurality of second nozzle outlets have a different spray pattern.

31. (currently amended) The fuel injector of claim ~~21~~ 30 wherein said at least one nozzle outlet is at least one homogeneous charge outlet; and

said ~~at least one additional nozzle outlet is at least one~~ plurality of second nozzle outlets include a plurality of conventional nozzle outlets.